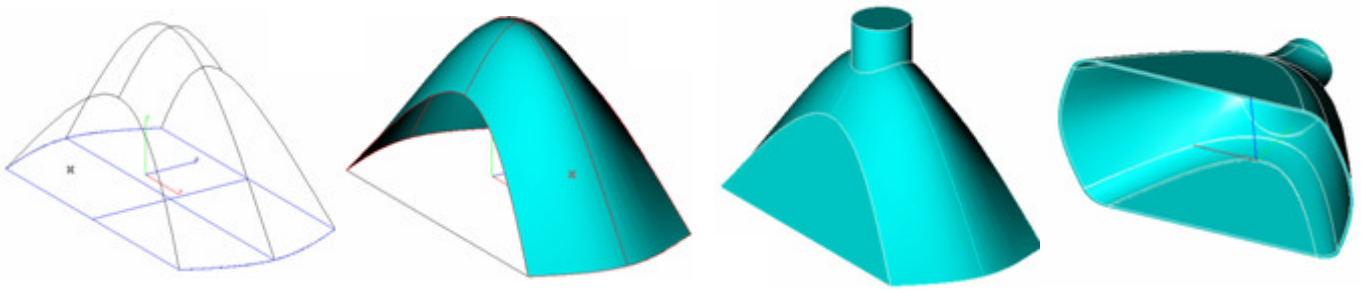


The Modeling Process and Understanding Design Intent

General Workflow

In general, you begin by laying out the form and drawing shapes using the wire frame tools.

Then, using a combination of surface and solid tools, you build your design from the wire frames.



General Uses of Surface and Solid Tools

Surface tools are useful for creating complex, organic shapes and also for creating very specific detail shapes or to trim and modify solid shapes.

Solid tools are used for quick creation of general shapes and also for adding details such as rounded edges, holes/cutouts, protrusions, hollowed areas and more.

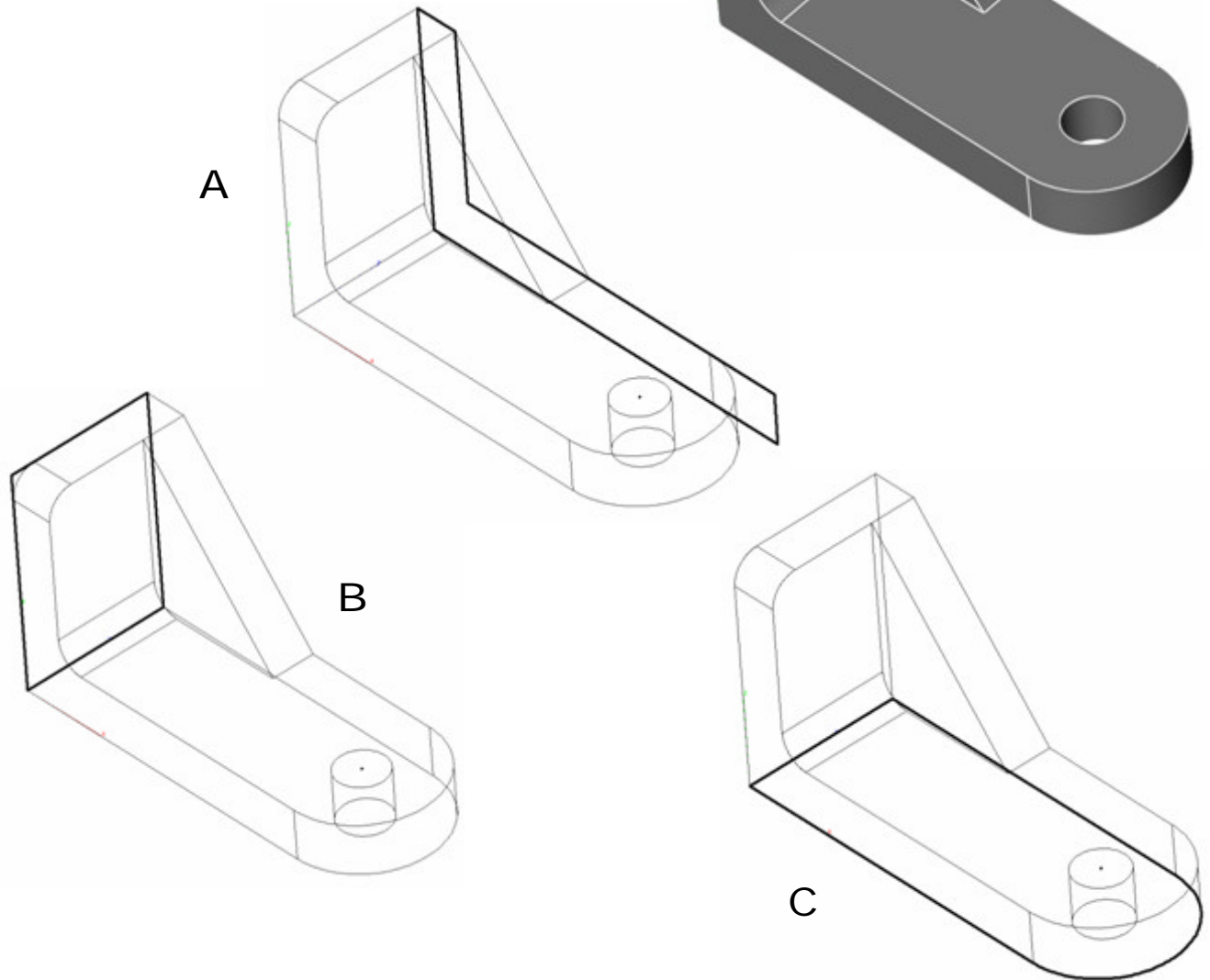
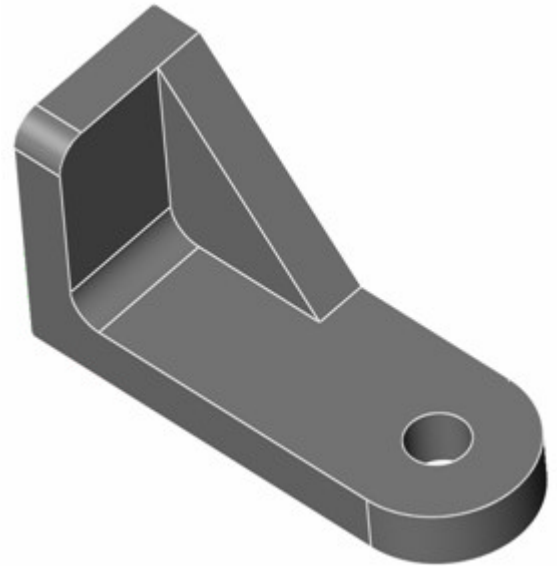
With the combination of surface and solid tools almost any shape is possible to create.

Modeling is a Problem Solving Process

There is no magic Make My Part now button. 3D Modeling is a step-by-step problem solving process. First figure out a strategy to approach the model, such as breaking the shape down into simpler shapes and then building it up into the finished model. Each step along the way will present new challenges and choices about how best to accomplish a particular detail or feature of the model.

The first step to modeling even a simple part is to decide what is the best way to start or what is the best “profile” shape.

Consider what profile shape will generate more of the model than any other.



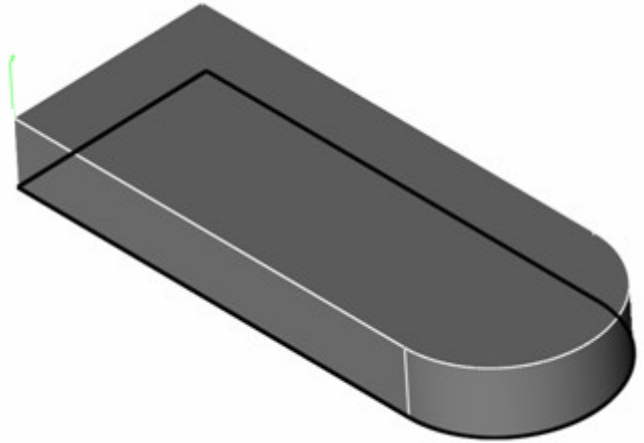
A – This is a good profile that will generate a lot of the shape quickly, but it will take a bit of extra work to create the rounded end.

B – This profile will generate a block that will require a lot of cutting and trimming to get to the final shape...this is not a very good choice.

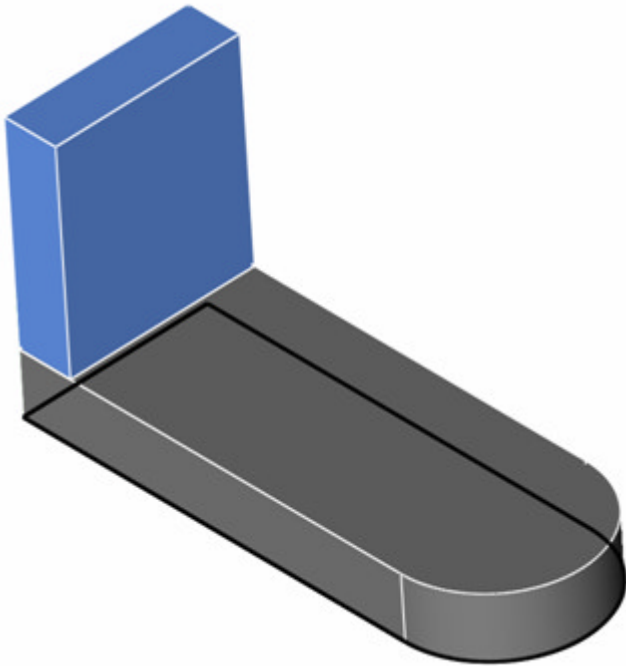
C – This profile will create a base object with the rounded end built in, and then it just needs two simple pieces added. This is probably the best choice.



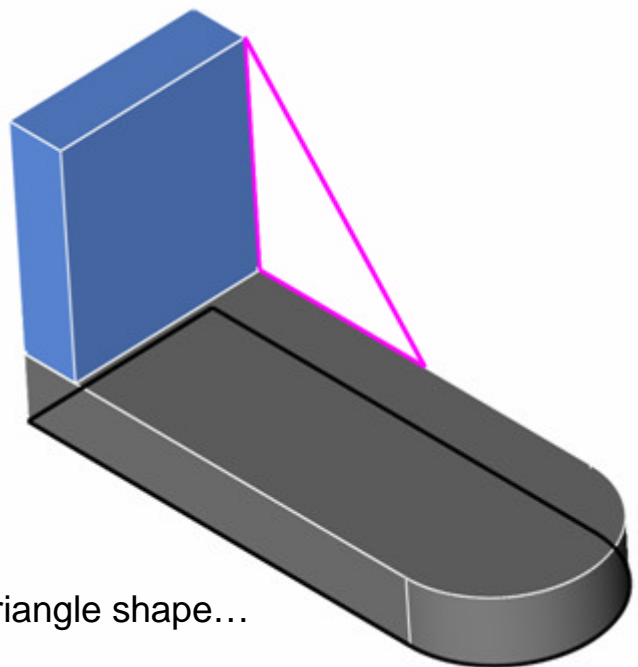
So draw the base shape from the top view first.



Then extrude that shape.

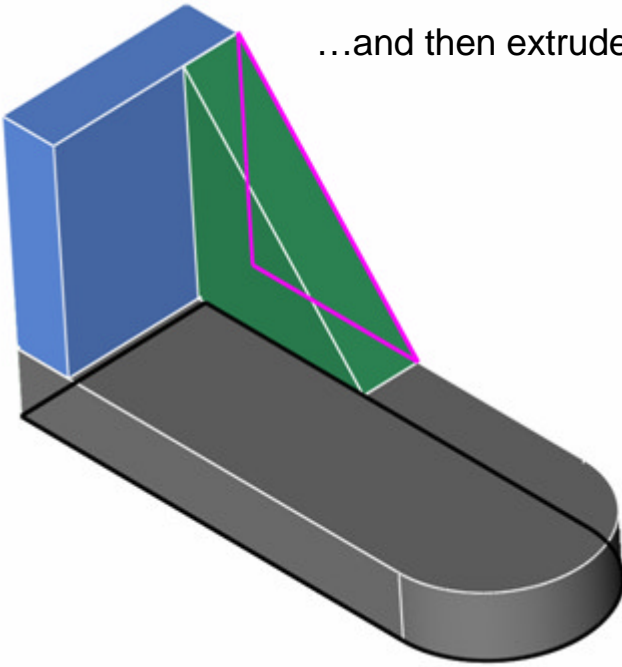


Next, quickly create the back part by using the block primitive.

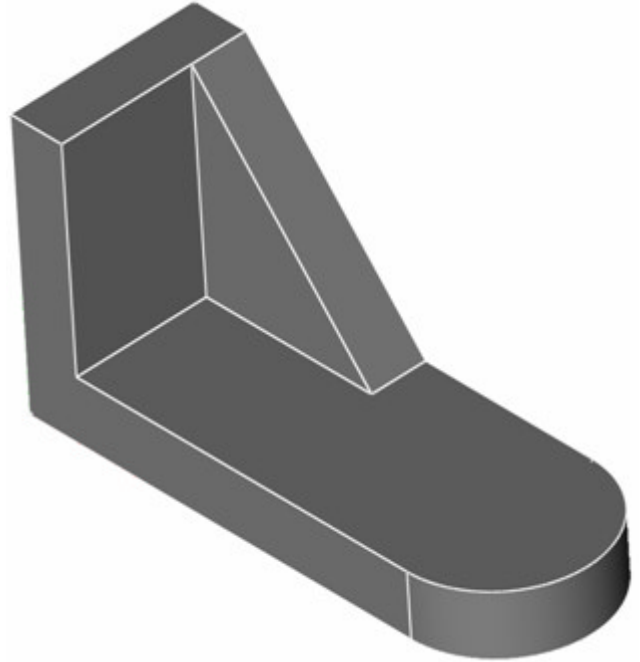


Then draw the triangle shape...

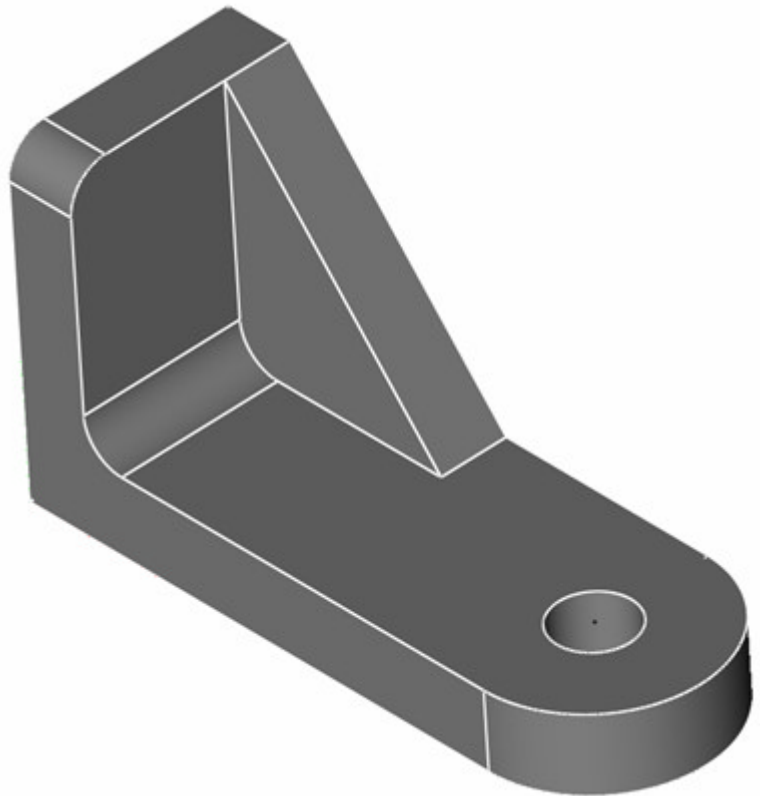
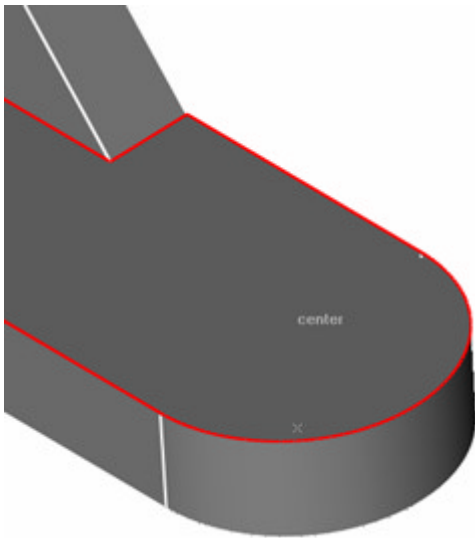
...and then extrude the triangle.



Next, add all the pieces together.



Finally, add the hole and round off the corners.



Making a Simple Water Bottle

There is usually more than one way to make any shape. Different approaches can have advantages and disadvantages, especially when you begin to consider how certain features might need to be changed at a later time.

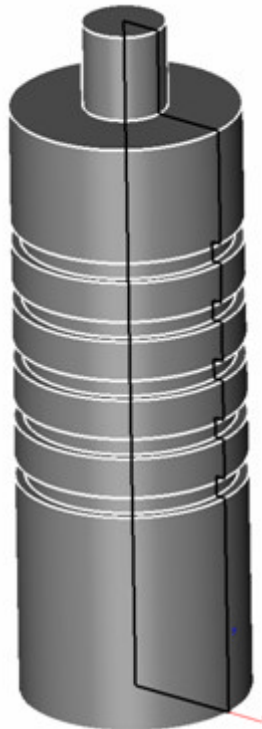
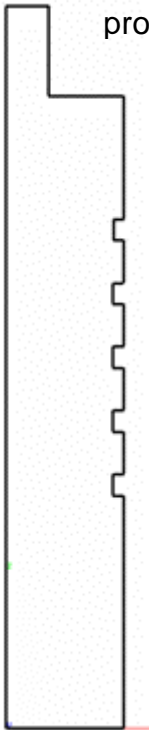
This can be one of the most important considerations when deciding how to approach a modeling task. Different approaches can make certain features easy or difficult to modify later. Try to think ahead and anticipate the types of things that might change and then choose a suitable method of modeling that makes those changes easier to accomplish.

Below are several possible ways to model this water bottle shape. Also shown is the modeling method used, affects what and how things can be modified.

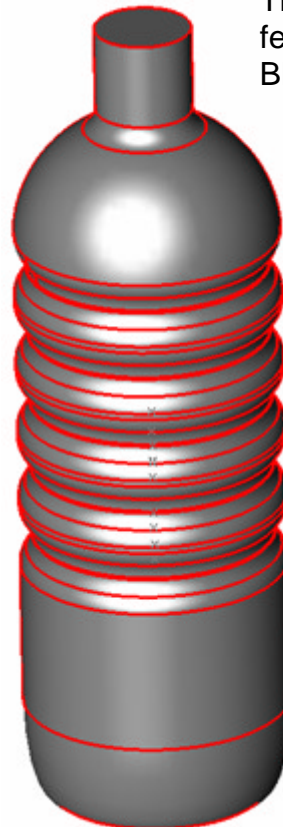


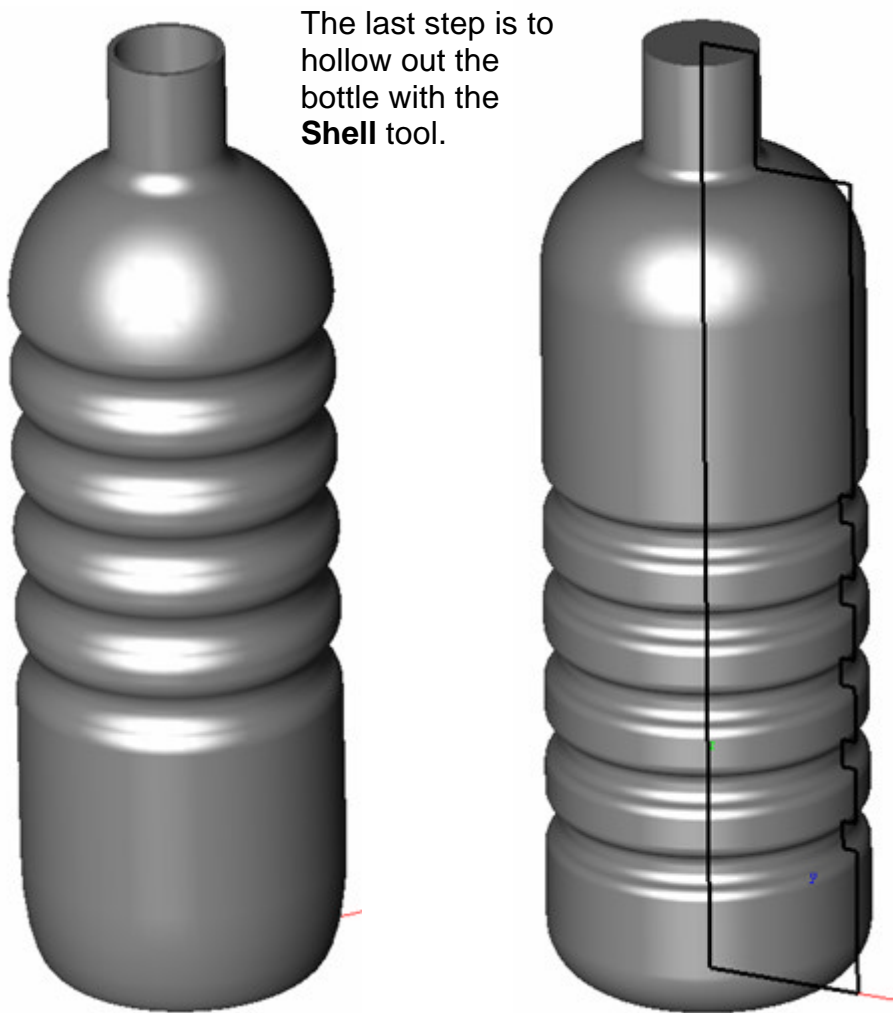
Possible Method 1

In this method we start with a simplified profile, and then revolve it as a solid.



Then all of the rounded features are created with Blends.





The last step is to hollow out the bottle with the **Shell** tool.

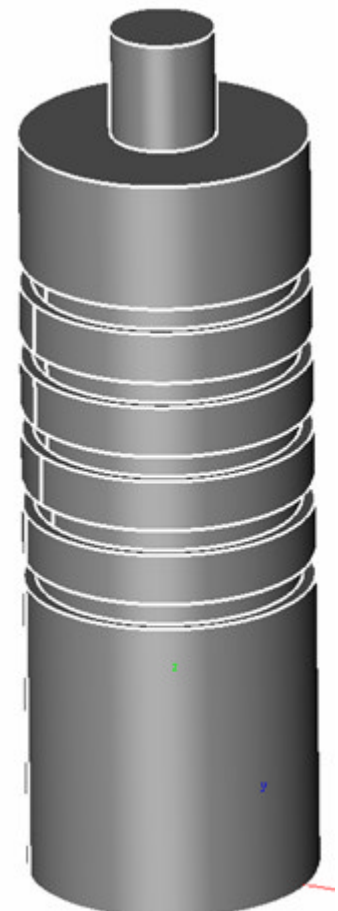
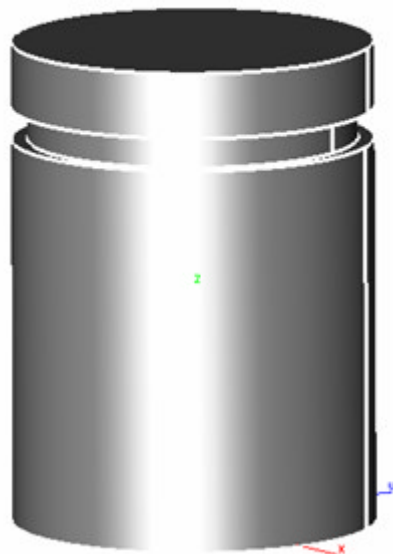
By creating the bottle from a simple profile and then adding lots of fillets, this allows each fillet to be edited separately and changed.

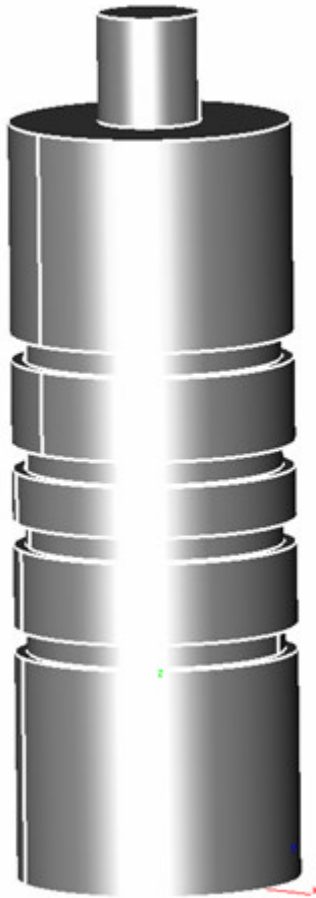
It is also easy to change the position and size of the grip features or the overall bottle dimensions by carefully dragging and changing the profile, just be careful not to create a gap in the profile.

Lastly, change the thickness of the bottle by changing the shell thickness.

Possible Method 2

Another method would be to build up the bottle out of several individual cylinder primitives, like a layer cake.





One distinct advantage of this method is that you can easily change the configuration, size, and number of the grip sections.

Changing the number of sections is something that is difficult or impossible to do using a revolved profile.

Possible Method 3

A third method would be to draw the detailed profile to be revolved.

This can sometimes be a quick and easy way to make the shape, but it also limits what can be changed.

One benefit, however, is that this method is often a good work-around for times when the geometry is complex and shelling out the shape does not work.

With this method you just build in the “shell” feature into the profile shape, then you don’t actually have to shell at all.

